

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

ANDERSSON, Per
Albihns Göteborg AB
P.O. Box 142
S-401 22 Göteborg
SUÈDE

| | |
|---|--|
| Date of mailing (day/month/year) 11 June 2001 (11.06.01) | IMPORTANT NOTIFICATION |
| Applicant's or agent's file reference 112110 PA | |
| International application No. PCT/SE00/01883 | International filing date (day/month/year) 28 September 2000 (28.09.00) |

| | | |
|--|---|---|
| 1. The following indications appeared on record concerning: | | |
| <input type="checkbox"/> the applicant | <input type="checkbox"/> the inventor | <input checked="" type="checkbox"/> the agent |
| <input type="checkbox"/> the common representative | | |
| Name and Address ANDERSSON, Per Albihns Patentbyrå Göteborg AB P.O. Box 142 S-401 22 Göteborg Sweden | State of Nationality | State of Residence |
| | Telephone No. 46 31 725 81 00 | |
| | Facsimile No. 46 31 711 95 55 | |
| | Teleprinter No. | |
| 2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning: | | |
| <input type="checkbox"/> the person | <input type="checkbox"/> the name | <input type="checkbox"/> the address |
| <input type="checkbox"/> the nationality | <input type="checkbox"/> the residence | |
| Name and Address ANDERSSON, Per Albihns Göteborg AB P.O. Box 142 S-401 22 Göteborg Sweden | State of Nationality | State of Residence |
| | Telephone No. 46 31 725 81 00 | |
| | Facsimile No. 46 31 711 95 55 | |
| | Teleprinter No. | |
| 3. Further observations, if necessary: The new agent's address on the Demand has been considered as a change under Rule 92bis. In case of disagreement, the International Bureau should be notified immediately. | | |
| 4. A copy of this notification has been sent to: | | |
| <input checked="" type="checkbox"/> the receiving Office | <input type="checkbox"/> the designated Offices concerned | |
| <input type="checkbox"/> the International Searching Authority | <input checked="" type="checkbox"/> the elected Offices concerned | |
| <input checked="" type="checkbox"/> the International Preliminary Examining Authority | <input type="checkbox"/> other: | |

| | |
|---|---------------------------------------|
| The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland | Authorized officer A. Karkachi |
| Facsimile No.: (41-22) 740.14.35 | Telephone No.: (41-22) 338.83.38 |

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE
 in its capacity as elected Office

| | |
|---|---|
| Date of mailing (day/month/year) 11 June 2001 (11.06.01) | |
| International application No. PCT/SE00/01883 | Applicant's or agent's file reference 112110 PA |
| International filing date (day/month/year) 28 September 2000 (28.09.00) | Priority date (day/month/year) 01 October 1999 (01.10.99) |
| Applicant JOHANSSON, Arne | |

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
 23 April 2001 (23.04.01)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

| | |
|---|---|
| The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35 | Authorized officer A. Karkachi Telephone No.: (41-22) 338.83.38 |
|---|---|

PATENT COOPERATION TREATY

2001-01-02

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION CONCERNING
SUBMISSION OR TRANSMITTAL
OF PRIORITY DOCUMENT

(PCT Administrative Instructions, Section 411)

To:

ANDERSSON, Per
Albihns Patentbyrå Göteborg AB
P.O. Box 142
S-401 22 Göteborg
SUÈDE

| | |
|--|--|
| Date of mailing (day/month/year) 19 December 2000 (19.12.00) | |
| Applicant's or agent's file reference 112110 PA | IMPORTANT NOTIFICATION |
| International application No. PCT/SE00/01883 | International filing date (day/month/year) 28 September 2000 (28.09.00) |
| International publication date (day/month/year) Not yet published | Priority date (day/month/year) 01 October 1999 (01.10.99) |
| Applicant VOLVO ARTICULATED HAULERS AB et al | |

1. The applicant is hereby notified of the date of receipt (except where the letters "NR" appear in the right-hand column) by the International Bureau of the priority document(s) relating to the earlier application(s) indicated below. Unless otherwise indicated by an asterisk appearing next to a date of receipt, or by the letters "NR", in the right-hand column, the priority document concerned was submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b).
2. This updates and replaces any previously issued notification concerning submission or transmittal of priority documents.
3. An asterisk(*) appearing next to a date of receipt, in the right-hand column, denotes a priority document submitted or transmitted to the International Bureau but not in compliance with Rule 17.1(a) or (b). In such a case, **the attention of the applicant is directed** to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.
4. The letters "NR" appearing in the right-hand column denote a priority document which was not received by the International Bureau or which the applicant did not request the receiving Office to prepare and transmit to the International Bureau, as provided by Rule 17.1(a) or (b), respectively. In such a case, **the attention of the applicant is directed** to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

| <u>Priority date</u> | <u>Priority application No.</u> | <u>Country or regional Office or PCT receiving Office</u> | <u>Date of receipt of priority document</u> |
|-------------------------|---------------------------------|---|---|
| 01 Octo 1999 (01.10.99) | 9903568-5 | SE | 05 Dece 2000 (05.12.00) |

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No. (41-22) 740.14.35

Authorized officer

Khemais BRAHMI

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003730936

10/088584

TITLE

Vehicle extension device

JC10 Rec'd PCT/PTO 21 MAR 2002

TECHNICAL FIELD

- 5 The present invention relates to an extension device for automotive vehicles, such as dumpers, comprising a framework with a front end section and a rear end section, said automotive vehicles including a forward vehicle section, supporting the prime mover, exhibiting a first articulation member, and a rear vehicle section exhibiting a second articulation member, said first and second articulation members being
- 10 intended for connection with each other and for allowing pivoting of the vehicle sections, in relation to each other, around a longitudinal axis of the automotive vehicle.

BACKGROUND ART

- When manufacturing commercial automotive vehicles, such as dumpers, it is presently customary to offer, together with a standardised forward vehicle section, a rear, load-carrying vehicle section, the length of which is adapted to the intended area of application and to any built-on accessories, such as a crane. This is resolved by manufacturing the rear vehicle section with a large number of frame lengths.

- 20 The above approach is not cost-effective, however, as production and storage will both be expensive due to the relatively small production series. Further, modifications to the vehicle length cannot be allowed after delivery.

- However, there are cases where the fixed framework of the rear vehicle section is cut off, whereupon extension beams are welded in to obtain, in this way, a vehicle of the required length.

- This, however, is a complicated and time-consuming operation, a/o requiring access to special tools and special equipment. Furthermore, such a solution may require giving the construction a lower strength at the joints, compared to the rest of the construction. Besides this, a subsequent treatment in the form of corrosion protection and painting has to be performed at the joints.

From SE 505 201 a vehicle chassis is previously known, intended for subsequent building-on of equipment, divided into a forward and a rear portion, each having two longitudinal frame members, connected to each other through an intermediate portion. Said intermediate portion comprises an intermediate framework and a number of holed junction members allowing free choice between a number of hole combinations for connecting the intermediate framework, by means of bolt or rivet joints, with the forward and rear portions of the vehicle chassis. An adjustment of the total length of the vehicle chassis can thus be made, in dependence of the selected size of the accessory subsequently to be fitted.

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Although the method for extending vehicle frames described above enables an adaptation of the vehicle length, it still has some drawbacks. When modifying the vehicle length a large number of bolts, or rivets, will primarily have to be removed and, after the length adjustment, be refitted, which is very time-consuming. Furthermore, also in this case, there is a risk of the construction having a lower strength in relation to other framework portions.

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Common to the above procedures for extension of automotive vehicles after delivery is that relatively large operations have to be performed on the framework of the vehicle, constituting a problem for the vehicle user.

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DISCLOSURE OF INVENTION

The object of the invention is to enable an extension of the dumper without having to perform major reconstruction work on the dumper.

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The above object is achieved by means of an extension device, the characteristics of which are defined by the independent claim 1.

30

It is a further object of the invention to provide a device for extension of automotive vehicles, such as dumpers, by which a simple, quick and secure adaptation can be made of the vehicle length, by utilising the parting line provided by the first and second articulation members of the dumper and inserting therebetween an extension device according to the present invention.

It is a further object of the invention to provide a device for extension of vehicles without having to perform extensive fitting work such as bolting/riveting/welding on the vehicle when one and the same vehicle is to be used for different work assignments.

5

The extension device according to the present invention is formed like a framework, comprising two parallel girders enclosed by walls, together defining an elongated, hollow girder having a forward end section and a rear end section, at least the forward one of said end sections being provided with a third articulation member, preferably in the form of a pivot sleeve with a circular cross section, which can be connected to the first articulation member arranged on the forward vehicle section of the dumper that is formed like a pivot pin having a circular cross section.

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In a preferred embodiment of the present invention, the extension device is provided with a guide pin, the shape of which substantially coincides with said pivot pin, serving as a guide and reinforcement when fitting the extension device onto the rear, load-carrying vehicle section.

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Further advantages and objects of the invention will become apparent from the appended claims and the following description.

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BRIEF DESCRIPTION OF DRAWINGS

The invention will be described below in connection with preferred embodiment examples and the enclosed drawings, in which

- Fig. 1 shows a side elevational view of a dumper equipped with an extension device according to the present invention,
- Fig. 2 shows the front end section of an extension device according to the present invention,
- Fig. 3 shows a longitudinal, vertical cross section through an extension device according to the present invention, and
- Fig. 4 shows a longitudinal, vertical cross section through an extension device, fitted onto a rear vehicle section, according to the present invention.

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PREFERRED EMBODIMENT

Fig. 1 illustrates a side elevational view of an articulated or frame-steered vehicle, a so-called dumper 1, having in a known manner a forward vehicle section 2, supporting the prime mover, and a rear, load-carrying vehicle section 3, connected to the forward vehicle section 2 via a vertical pivot axle 4. Between the forward vehicle section 2 and the rear vehicle section 3, an extension device 10 according to the present invention is arranged.

The forward and rear vehicle sections, 2 and 3, respectively, are also pivotally connected to each other about a not shown horizontal pivot pin, allowing the vehicle sections to pivot in relation to each other about a longitudinal axis of the vehicle.

For steering of the vehicle 1 when being driven, the forward vehicle section 2 is brought to turn about the vertical pivot axle 4 by means of a pair of not shown hydraulic cylinders, arranged one on each side of the pivot axle 4. The torque delivered by the prime mover is transferred to the front wheels 5 and to the rear wheels 6, 7, via a not shown cardan shaft.

With reference to Figs. 2 and 3, a preferred embodiment of an extension device 10 according to the present invention will now be described. In the illustrated embodiment, the extension device 10 is formed like a framework comprising two parallel girders enclosed by walls, together defining an elongated, hollow girder. The framework hereby comprises an upper supporting portion 11 and a lower supporting portion 12 extending between a forward end section 13 and a rear end section 14. Adjacent to said upper supporting portion 11, two parallel girders 8, 9 extend between said end sections 13, 14. Side portions 15, 16, 17, 18 also extend between the end sections 13, 14, providing, together with the girders 8, 9 and the upper 11 and the lower 12 supporting portions, the stiffness and strength of the construction. According to a preferred embodiment, the above-mentioned portions 11, 12, 15, 16, 17, 18 and the sections 13, 14 are comprised of steel plates welded together to define said elongated, hollow girder.

In the forward end section 13, a third articulation member in the form of a pivot sleeve 19 with a circular cross section, intended for co-operation with a horizontal

pivot pin with a circular cross section, arranged on the forward vehicle section 2, allowing the extension device 10 to pivot, in relation to said forward vehicle section 2, about a longitudinal axis of the vehicle 1. In a preferred embodiment, the pivot sleeve 19 is on the one hand connected to the end section 13, on the other to a bulkhead 20, arranged in parallel with the end section 13 and constituting a connection member between said upper 11 and lower 12 supporting portions.

Fig. 3 shows an especially preferred embodiment of the present invention in which the rear end section 14 is provided with a guide pin 21 of circular cross section. When fitting the extension device 10 onto the rear vehicle section 3, the guide pin 21 will function as a guide, through being inserted into the articulation member 22 of the rear vehicle section 3. When the extension device 10 is fitted onto the rear vehicle section 3, the guide pin 21 will contribute to reinforcing the junction between the vehicle section 3 and the extension device 10.

Fig. 4 illustrates a more complete embodiment of the present invention with the extension device 10 fitted between the forward vehicle section 2 and the rear vehicle section 3. The guide pin 21 is hereby inserted into the articulation member 22 of the rear vehicle section 3, substantially coinciding in shape with the previously discussed pivot sleeve 19. To prevent rotation about the guide pin 21 of the extension device 10, relative to the rear vehicle section 3, a bolted joint 23 is provided, connecting the rear end section 14 of the extension device 10 with the rear vehicle section 3. Said bolted joint 23 is accessed through an aperture 24 provided in the upper supporting portion 11.

In Fig. 4, the previously mentioned horizontal pivot pin 25 is shown, which is connected, via the pivot axle 4, to the forward vehicle section. The pivot pin 25 is locked in the axial direction in relation to the pivot sleeve 19 of the extension device, by means of a locking member in the form of a nut 29 arranged to co-operate with a threaded portion 30 on the pivot pin 25.

According to a preferred embodiment, the dumper 1 is provided with a drive for the rear pairs of wheels 5, 6, and the torque provided by the prime mover is then transferred via a cardan shaft 26, 27 where the cardan shaft portion 27, located inside the

extension device 10, is an extension member. Said cardan shaft portion 27 is preferably rotatably supported, for example by a ball bearing assembly 28, inside the guide pin 21.

- 5 According to a preferred embodiment of the extension device 10, a brake caliper 31 is fixedly connected to the framework of the extension device 10. Said brake caliper 31 is co-operating with a brake disc 32 arranged on the cardan shaft portion 27. When the brake caliper 31 is activated, in the known manner, the rear wheels 6, 7 are braked.

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The term dumper, as used in the description and in the claims, shall mean any type of commercial automotive vehicle equipped with a forward vehicle section, supporting the prime mover, and a load- or equipment-carrying rear vehicle section, said vehicle sections being interconnected by means of a pivot joint allowing the vehicle sections to pivot, in relation to each other, about a longitudinal axis of the vehicle.

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- The invention will not be limited to what has been stated above, but may be varied within the scope of the appended claims. For example, the guide pin 21 could be excluded and replaced by any other type of fixation, such as a bolted or welded connection. Further, said first and second articulation members do not have to be formed like a pivot pin and a pivot sleeve, respectively, but could be formed like a turntable comprising a vertical ball bearing assembly, the rotational axis of which would be parallel with the longitudinal axis of the vehicle, one bearing race of the assembly being affixed to the forward vehicle section and the other bearing race being affixed to the rear vehicle section. In the above embodiment example, relative rotation is taking place between the vehicle sections at the connection between the forward vehicle section and the extension device, but it should be evident to the person skilled in the art that the rotation could just as well take place between the rear vehicle section and the extension device, or even at both of the above-mentioned locations. Furthermore it is advantageous to provide the extension device with a built-on accessory in the form of for example a crane.
- 20
- 25
- 30

CLAIMS

1. An extension device for automotive vehicles, such as dumpers (1), comprising a framework with a front end section (13) and a rear end section (14),
5 said automotive vehicles including a forward vehicle section (2), supporting the prime mover, exhibiting a first articulation member (25), and a rear vehicle section (3) exhibiting a second articulation member (22), said first (25) and second articulation members (22) being intended for connection with each other and for allowing pivoting of the vehicle sections (2, 3), in relation to each other, about a longitudinal
10 axis of the automotive vehicle, characterised by at least one of said end sections (13, 14) being provided with a third articulation member (19) intended for connection with one of said first (25) or second (22) articulation members.
2. The extension device for automotive vehicles according to claim 1,
15 characterised by said first articulation member (25) comprising a pivot pin having a circular cross section and being intended for connection with said third articulation member (19) consisting of a pivot sleeve with a circular cross section.
3. The extension device for automotive vehicles according to claim 2,
20 characterised by said framework comprising at least two, substantially parallel girders (8, 9), extending between said end sections (13, 14).
4. An extension device for automotive vehicles according to any one of the previous claims, characterised by said framework comprising an
25 upper supporting portion (11), a lower supporting portion (12) and side portions (15, 16, 17, 18), said portions extending between said end sections (13, 14).
5. The extension device for automotive vehicles according to claim 4,
30 characterised by said upper supporting portion (11) being provided with an aperture (24), allowing access to the inside of the extension device (10).
6. An extension device for automotive vehicles according to any one of the previous claims, characterised by a guide pin (21) with a substantially cylindrical cross-section being arranged on the rear end section (14).

7. The extension device for automotive vehicles according to claim 6,
c h a r a c t e r i s e d b y said guide pin (21) being provided with a bearing (28)
preferably a ball bearing assembly (28) for supporting a cardan shaft portion (27)
5 extending through the extension device (10).

8. The extension device for automotive vehicles according to claim 7,
c h a r a c t e r i s e d b y a brake disc (32) being arranged on said cardan shaft
portion (27), said disc co-operating, for braking, with a brake caliper (31) fixedly
10 connected to the extension device (10).

PATENT COOPERATION TREATY

PCT

REC'D 25 JUL 2001

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

WIPO

PCT

(PCT Article 36 and Rule 70)

14

| | | |
|---|---|--|
| Applicant's or agent's file reference 112110 PA | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) | |
| International application No. PCT/SE00/01883 | International filing date (day month year) 28.09.2000 | Priority date (day month year) 01.10.1999 |
| International Patent Classification (IPC) or national classification and IPC ⁷ B62D 53/02 | | |
| Applicant Volvo Articulated Haulers AB et al | | |

| |
|--|
| 1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36. |
| 2. This REPORT consists of a total of <u>3</u> sheets, including this cover sheet. <input type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT). These annexes consist of a total of _____ sheets. |
| 3. This report contains indications relating to the following items: I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application |

| | |
|--|--|
| Date of submission of the demand 23.04.2001 | Date of completion of this report 21.06.2001 |
| Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. 08-667 72 88 | Authorized officer Göran Carlström/js Telephone No. 08-782 25 00 |

I. Basis of the report**1. With regard to the elements of the international application:***

- ☒ the international application as originally filed
- ☐ the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☐ the claims:
pages _____, as originally filed
pages _____, as amended (together with any statement) under article 19
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☐ the drawings:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language English which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☒ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheet/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2 (c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/SE00/01883

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | | |
|-------------------------------|--------|------------|-----|
| Novelty (N) | Claims | <u>1-8</u> | YES |
| | Claims | | NO |
| Inventive step (IS) | Claims | <u>1-8</u> | YES |
| | Claims | | NO |
| Industrial applicability (IA) | Claims | <u>1-8</u> | YES |
| | Claims | | NO |

2. Citations and explanations (Rule 70.7)

The claimed invention is not considered to be anticipated by the patent documents cited. None of these documents reveals the vehicle extension device described in the claims.

The invention according to claims 1- 8 is therefore considered to be novel, to involve an inventive step and to be industrially applicable.

SU 729100 A (LENINGRAD FORESTRY ACAD)

FR 2554394 A1 (ROULIERE, PAUL)

PCT REQUEST

The undersigned request that the present international application be processed according to the Patent Cooperation Treaty.

09-11-2000

For receipt Office use only

International Application No.

ST/ SE 00 / 01883

International Filing Date

28-09-2000

The Swedish Patent Office
PCT International Application

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference 112110 PA
(if desired) (12 characters maximum)

| | |
|---|---|
| Box No. I TITLE OF INVENTION | |
| Vehicle extension device | |
| Box No. II APPLICANT | |
| Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no State of residence is indicated below.) | |
| Volvo Articulated Haulers AB Västra Esplanaden 9 A SE-351 83 VÄXJÖ Sweden | |
| <input type="checkbox"/> This person is also inventor. | |
| Telephone No. | |
| Facsimile No. | |
| Teleprinter No. | |
| State (that is, country) of nationality: SE | State (that is, country) of residence: SE |
| This person is the applicant for the purposes of: <input type="checkbox"/> all designated States <input checked="" type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box | |
| Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S) | |
| Name and address: Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (i.e. country) of residence if no State of residence is indicated below.) | |
| JOHANSSON Arne Hasselvägen 39 SE-360 42 BRAÅS Sweden | |
| This person is: <input type="checkbox"/> applicant only <input checked="" type="checkbox"/> applicant and inventor <input type="checkbox"/> inventor only (If this check-box is marked, do not fill in below.) | |
| State (that is, country) of nationality: SE | State (that is, country) of residence: SE |
| This person is the applicant for the purposes of: <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input checked="" type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box | |
| <input type="checkbox"/> Further applicants and/or (further) inventors are indicated on a continuation sheet. | |
| Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE | |
| The person identified below is hereby has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: <input checked="" type="checkbox"/> agent <input type="checkbox"/> common representative | |
| Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) | |
| ANDERSSON Per, BERGQUIST Gunnar, BRUN Jonny, GRAUDUMS Valdis, HARRISON Michael, MOSSMARK Anders, OLSSON Stefan, ROMARE Anette, ROSANDER Bengt, SCHLOSSMAN Ulf, SÖRSDAHL Petter ALBIHNS PATENTBYRÅ GÖTEBORG AB, P.O. Box 142, S-401 22 GÖTEBORG, Sweden | |
| Telephone No. +46 31 725 81 00 | |
| Facsimile No. +46 31 711 95 55 | |
| Teleprinter No. | |
| <input type="checkbox"/> Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent. | |

Box No. V DESIGNATION STATES

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes; at least one must be marked):

Regional Patent

- ☒ **AP** ARIPO Patent: GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting state of the Harare Protocol and of the PCT
- ☒ **EA** Eurasian Patent: AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP** European Patent: AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is Contracting State of the European Patent Convention and of the PCT
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| Filing date of earlier application (day/month/year) | Number of earlier application | Where earlier application is: | | |
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| Göteborg, 28 September 2000 | | | | |
|  Per Andersson | | | | |

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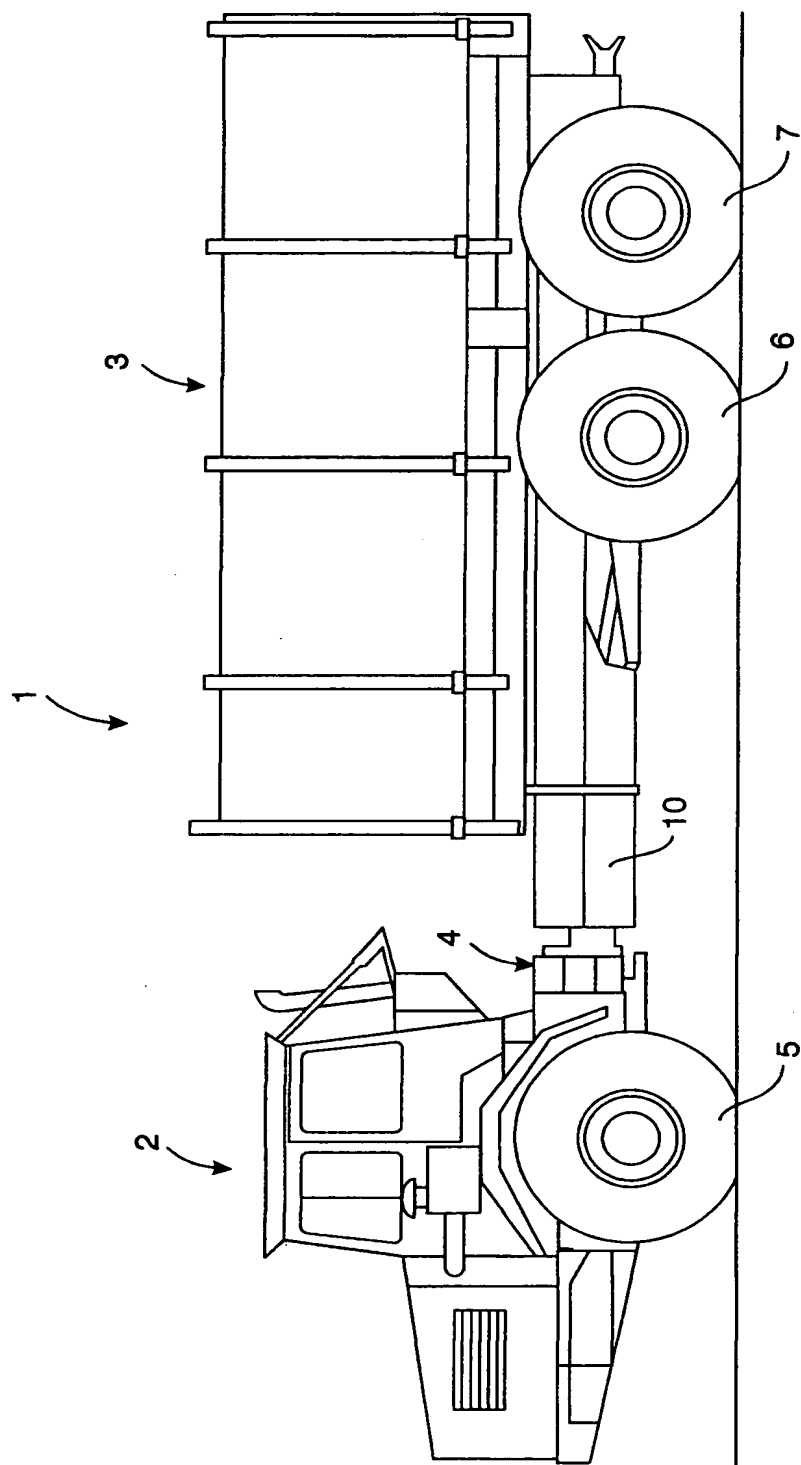


Fig.1

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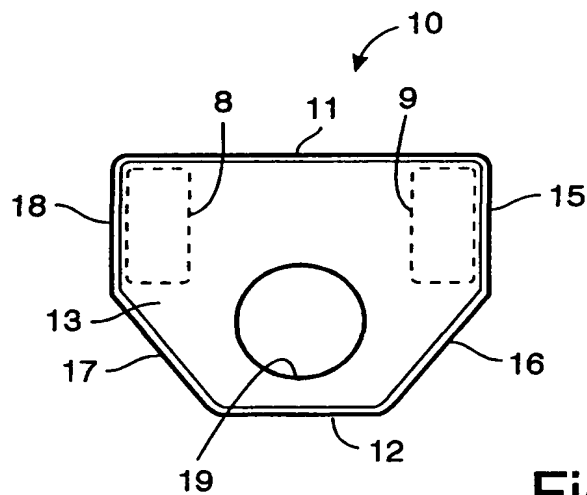


Fig.2

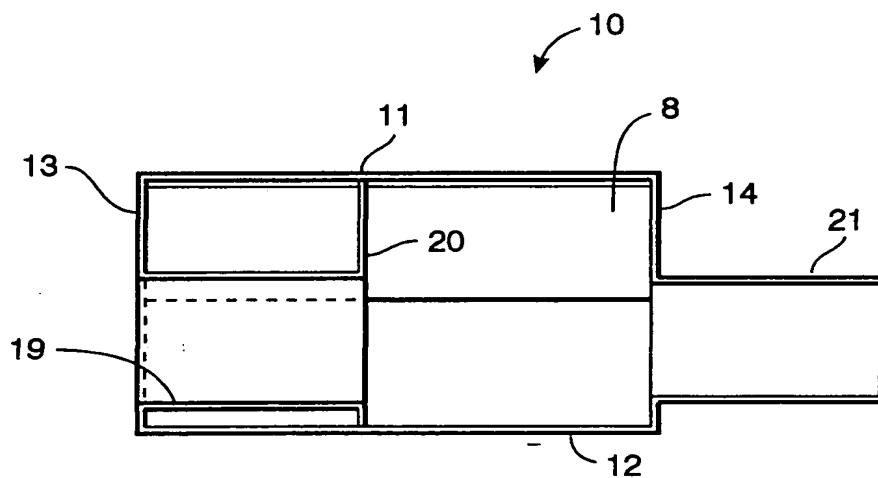
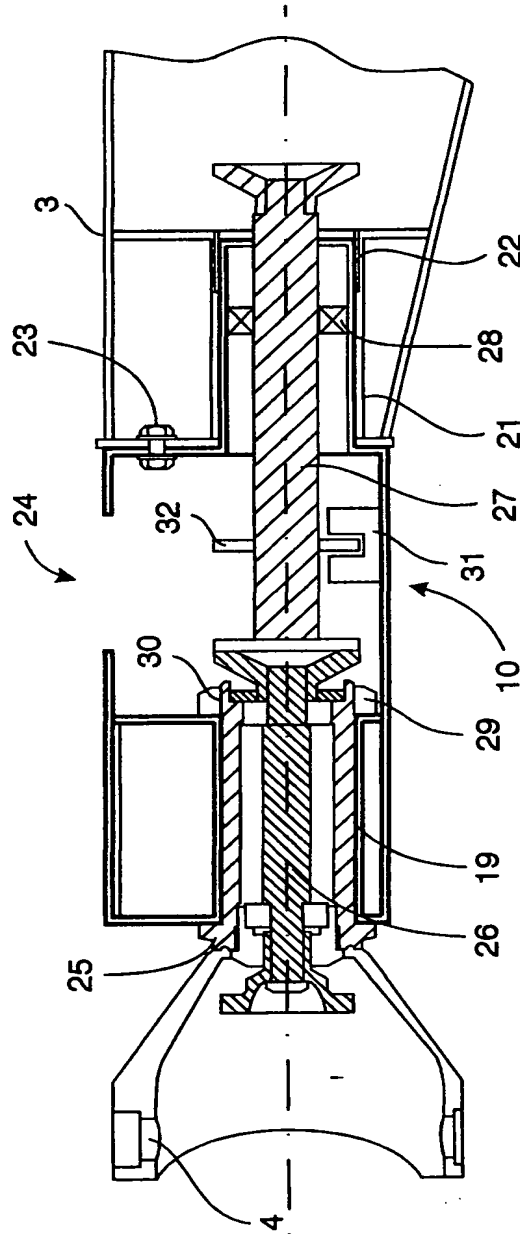


Fig.3

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Fig.4



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Titel

Förlängningsanordning för motorfordon.

5

Tekniskt område

Föreliggande uppfinning avser en förlängningsanordning för motorfordon, såsom dumprar, innefattande en ramkonstruktion med en främre ändsektion och en bakre ändsektion där nämnda motorfordon innefattar en främre drivmotoruppbärande fordonsdel med ett första ledorgan samt en bakre fordonsdel med ett andra ledorgan varvid nämnda första och andra ledorgan är avsedda att förbindas med varandra och medge inbördes vridning av fordonsdelarna kring en längdaxel hos motorfordonet.

Teknikens ståndpunkt

15 Vid tillverkning av kommersiella motorfordon, såsom dumprar, är det idag vanligt att till en standardiserad främre fordonsdel erbjuda en bakre lastbärande fordonsdel vars längd är anpassad till tänkt användningsområde och eventuella påbyggnationer, exempelvis en lyftkran. Detta löses genom att den bakre fordonsdelen specialtillverkas i ett stort antal ramlängder.

20

Ovan nämnda tillvägagångssätt är dock inte kostnadseffektivt då både tillverkning och lagerhållning blir dyrbar på grund av de relativt små tillverkningsserierna. Vidare medges inte ändringar av fordonslängden efter leverans.

25 Det förekommer dock att den bakre fordonsdelens fasta ram kapas varefter förlängningsbalkar svetsas i för att på så vis erhålla ett fordon av önskad längd.

Detta är dock ett komplicerat och tidsödande ingrepp som bland annat kräver tillgång till specialverktyg/specialutrustning. Vidare kan en sådan lösning innebära att konstruktionen ges en lägre hållfasthet i skarvställena i förhållande till konstruktionen i övrigt. Dessutom måste efterbehandling i form av rotskydd och målning utföras vid skarvställena.

30

Från SE 505 201 är förut känt ett fordonschassi, avsett för efterföljande påbyggnad, delat i en fram- och en bakdel som var och en har två längsgående rambalkar vilka är förbundna med varandra via en mellandel. Nämda mellandel innefattar en mellanram och ett antal hålförsedda skarvstycken vilka möjliggör fritt val mellan ett antal
5 hålkombinationer för mellanramens förbindning, medelst skruv- eller nitförband, med fordonschassits fram- och bakdel. I beroende av val av efterföljande påbyggnads storlek kan därmed justering av fordonschassits totallängd göras.

Fastän den ovan beskrivna metoden att förlänga fordonsramar ger möjlighet till
10 anpassning av fordonslängden så är den behäftad med vissa brister. Vid ändring av fordonslängden måste ett stort antal skruvar, alternativt nitar, först tas bort och, efter längdjusteringen, åter monteras vilket är mycket tidskrävande. Vidare riskerar även i detta fall konstruktionen att få lägre hållfasthet i förhållande till övriga ramdelar.

15 Gemensamt för ovannämnda förfarande för förlängning av motorfordon, efter leverans, är att relativt stora ingrepp i fordonets ramkonstruktion måste göras vilket utgör ett problem för användaren av fordonet.

Redogörelse för uppfinningen

20 Uppfinningens ändamål är att möjliggöra förlängning av en dumpern utan att omfattande ombyggnadsarbeten av dumpern måste företas.

Ovan nämnda ändamål uppnås med en förlängningsanordning vars särdrag framgår av det självständiga patentkravet 1.

25

Det är vidare ett ändamål med föreliggande uppfinning att tillhandahålla en anordning för förlängning av motorfordon, såsom dumprar, vid vilken enkel, snabb och säker anpassning av fordonets längd kan utföras genom att nyttja det delningsplan som dumperns första och andra ledorgan utgör och däremellan infoga en
30 förlängningsanordning enligt föreliggande uppfinning.

Det är vidare ett ändamål med uppfinningen att tillhandahålla en anordning för förlängning av fordon utan att omfattande monteringsarbete såsom skruvning/nitning/svetsning måste göras på fordonet då ett och samma fordon skall användas för olika arbetsuppgifter.

5

Förlängningsanordningen enligt föreliggande uppfinning är utformad som en ramkonstruktion, innefattande två parallella balkar inneslutna av väggar vilka tillsammans bildar en långsträckt ihålig balk, med en främre ändsektion och en bakre ändsektion där åtminstone den främre av nämnda ändsektioner är försedd med ett
10 tredje ledorgan, företrädesvis i form av en ledhylsa med cirkulärt tvärsnitt, vilket kan förbindas med det på dumpers främre fordonshalva anordnade första ledorganet vilket är utformat som en ledtapp med cirkulärt tvärsnitt.

I en föredragen utföringsform av föreliggande uppfinning är förlängningsanordningen
15 försedd med en styrtapp, vars utformning huvudsakligen överensstämmer med nämnda ledtapp, som tjänar som styrning och förstärkning vid montering av förlängningsanordningen på den bakre lastbärande fordonsdelen.

Ytterligare fördelar och ändamål med uppfinningen kan utläsas med hjälp av de
20 efterföljande patentkraven samt den efterföljande beskrivningen.

Figurbeskrivning

Uppfinningen kommer i det följande att beskrivas i anslutning till föredragna utföringsexempel samt de bifogade figurerna, där

- 25 figur 1 visar en sidovy av dumper utrustad med en förlängningsanordning enligt föreliggande uppfinning,
- figur 2 visar den främre ändsektionen av en förlängningsanordning enligt föreliggande uppfinning,
- figur 3 visar en sidovy, i tvärsnitt, av en förlängningsanordning enligt
30 föreliggande uppfinning och
- figur 4 visar en sidovy, i tvärsnitt, av en förlängningsanordning monterad på en bakre fordonsdel enligt föreliggande uppfinning.

Föredragen utföringsform

I figur 1 visas en sidovy av ett midje- eller ramstyrkt lastfordon, en s.k. dumper 1, som på känt sätt har en främre, drivmotoruppbärande fordonsdel 2 och en bakre, lastuppbärande fordonsdel 3 vilken över en vertikal ledaxel 4 är förbunden med den främre fordonsdelen 2. Mellan den främre fordonsdelen 2 och den bakre fordonsdelen 3 är anordnat en förlängningsanordning 10 enligt föreliggande uppfinning.

De främre och bakre fordonsdelarna 2 och 3 är även ledbart förbundna med varandra kring en icke visad horisontell ledtapp så att fordonsdelarna kan vridas inbördes kring en längdaxel hos fordonet.

För styrning av fordonet 1, då detta framförs, bringas den främre fordonsdelen 2 att svänga kring den vertikala ledaxeln 4 med hjälp av ett par, ej visade, hydraulcylindrar anordnade på varsin sida om ledaxeln 4. Det av drivmotorn levererade drivmomentet överförs till framhjulen 5 samt till bakhjulen 6, 7 via en ej visad kardanaxel.

Under hänvisning till figur 2 och 3 skall nu en föredragen utföringsform av en förlängningsanordning 10 enligt föreliggande uppfinning beskrivas. I det visade exemplet är förlängningsanordning 10 utformad som en ramkonstruktion innefattande två parallella balkar inneslutna av väggar vilka tillsammans bildar en långsträckt ihålig balk. Ramkonstruktionen innefattar härvid ett övre bärande parti 11 och ett nedre bärande parti 12 vilka sträcker sig mellan en främre ändsektion 13 och en bakre ändsektion 14. I anslutning till nämnda övre bärande parti 11 sträcker sig två parallella balkar 8, 9 mellan nämnda ändsektioner 13, 14. Mellan ändsektioner 13, 14 sträcker sig även sidopartier 15, 16, 17, 18 vilka tillsammans med balkarna 8, 9 och det övre 11 och nedre 12 bärande partierna ger konstruktionen dess styvhet och hållfasthet. Enligt ett föredraget utförande utgörs ovan nämnda partier 11, 12, 15, 16, 17, 18 och sektionerna 13, 14 av sammansvetsade stålplåtar för bildande av nämnda långsträckta ihåliga balk.

30

I den främre ändsektionen 13 är anordnat ett tredje ledorgan i form av en ledhylsa 19 med cirkulärt tvärsnitt vilken är avsedd att samverka med en på den främre fordonsdelen 2 anordnad horisontell ledtapp med cirkulärt tvärsnitt, så att förlängningsanordningen 10 kan vridas relativt nämnda främre fordonsdel 2 kring en

längdaxel hos fordonet 1. I en föredragen utföringsform är ledhylsan 19 dels förbunden med ändsektionen 13, dels med ett skott 20 vilket är planparallellt anordnat i förhållande till ändsektionen 13 och utgör ett förbindelseparti mellan nämnda övre 11 och nedre 12 bärande parti.

5

I figur 3 visas en särskilt föredragen utföringsform av föreliggande uppfinning där den bakre ändsektionen 14 är försedd med en styrtapp 21 med cirkulärt tvärsnitt. Vid montering av förlängningsanordningen 10 på den bakre fordonsdelen 3 fungerar styrtappen 21 som styrning genom att den då förs in i den bakre fordonsdelens 3 ledorgan 22. Då förlängningsanordningen 10 är monterad på den bakre fordonsdelen 3 bidrar styrtappen 21 till att förstärka övergången mellan fordonsdelen 3 och förlängningsanordningen 10.

Figur 4 visar ett mer komplett utförande av föreliggande uppfinning då förlängningsanordningen 10 är monterad mellan den främre fordonsdelen 2 och den bakre fordonsdelen 3. Styrtappen 21 är härvid införd i den bakre fordonsdelens 3 ledorgan 22 vilket till sin utformning huvudsakligen överensstämmer med tidigare nämnda ledhylsa 19. För att förhindra rotation, kring styrtappen 21, av förlängningsanordningen 10 relativt den bakre fordonsdelen 3 är anordnat ett skruvförband 23 vilket förbinder förlängningsanordningens 10 bakre ändsektion 14 med den bakre fordonsdelen 3. Nämnda skruvförband 23 nås genom en i det övre bärande partiet 11 anordnad öppning 24.

I figur 4 visas den tidigare nämnda horisontella ledtappen 25 vilken, via ledaxeln 4, är förbunden med den främre fordonsdelen 2. Ledtappen 25 är låst i axialled relativt förlängningsanordningens ledhylsa 19 medelst ett låsningselement i form av en mutter 29 vilken är anordnad att samverka med ett på ledtappen 25 gängat parti 30.

Enligt en föredragen utföringsform är dumpern 1 försedd med drivning på de bakre hjulparen 5, 6 och det av drivmotorn levererade momentet överförs då via kardanaxel 26, 27 där kardanaxelpartiet 27, anordnat i förlängningsanordningen 10, utgör en förlängningsdel. Nämnda kardanaxelparti 27 är med fördel lagrad, exempelvis med ett kullager 28, i styrtappen 21.

Enligt ett fördelaktigt utförande av förlängningsanordningen 10 är ett bromsok 31 fast förbundet, medelst ett ej visat skruvförband, med förlängningsanordningens 10 ramkonstruktion. Nämda bromsok 31 samverkar med en på kardanaxelpartiet 27 anordnad bromsskiva 32. Då bromsocket 31 aktiveras, på känt sätt, bromsas de
5 bakhjulen 6, 7.

Med den i beskrivningen och i patentkraven använda beteckningen dumper avses varje typ av kommersiella motorfordon vilka är utrustade med en främre drivmotoruppbärande fordonsdel och en bakre last- eller verktygsbärande fordonsdel
10 där nämnda fordonsdelar är förbundna med varandra via en vridled vilken medger inbördes vridning av fordonsdelarna kring en längdaxel hos fordonet.

Uppfinningen är inte begränsad till vad som anges ovan, utan kan varieras inom ramen för efterföljande patentkrav. Exempelvis kan styrtappen 21 utelämnas och
15 ersättas av annan typ av infästning såsom ett skruv- eller svetsförband. Vidare behöver nämnda första och andra ledorgan ej var utformade som en ledtapp respektive ledhylsa utan kan exempelvis vara utformad som en vändkrans innefattande ett vertikalt kullager vars rotationsaxel är parallell med fordonets längdaxel varvid
20 kullagrets ena lagerbana är fixerad vid den främre fordonsdelen och andra lagerbana är fixerad vid den bakre fordonsdelen. I det ovan beskrivna utföringsexemplet sker inbördes vridning mellan fordonsdelarna vid den främre fordonsdelens koppling till förlängningsanordningen men det torde vara uppenbart för fackmannen att vridningen istället kan ske mellan den bakre fordonsdelen och förlängningsanordningen eller till
och med vid båda ovan angivna ställen. Vidare är det fördelaktigt att förse
25 förlängningsanordningen med påbyggnationer i form av exempelvis en lyftkran.

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Patentkrav

1. Förlängningsanordning för motorfordon, såsom dumprar (1), innefattande en
5 ramkonstruktion med en främre ändsektion (13) och en bakre ändsektion (14) där
nämnda motorfordon innefattar en främre drivmotoruppbärande fordonsdel (2)
med ett första ledorgan (25) samt en bakre fordonsdel (3) med ett andra ledorgan
(22) varvid nämnda första (25) och andra ledorgan (22) är avsedda att förbindas
med varandra och medge inbördes vridning av fordonsdelarna (2, 3) kring en
10 längdaxel hos motorfordonet,
k ä n n e t e c k n a d a v
att åtminstone en av nämnda ändsektioner (13, 14) är försedd med ett tredje
ledorgan (19) vilket är avsett att förbindas med ett av nämnda första (25) eller
andra (22) ledorgan.
15
2. Förlängningsanordning för motorfordon enligt patentkrav 1
k ä n n e t e c k n a d a v
att nämnda första ledorgan (25) innefattar en ledtapp med cylindriskt tvärsnitt och
är avsett att förbindas med nämnda tredje ledorgan (19) innefattande en ledhylsa
20 med cirkulärt tvärsnitt.
3. Förlängningsanordning för motorfordon enligt patentkrav 2
k ä n n e t e c k n a d a v
att nämnda ramkonstruktion innefattar åtminstone två huvudsakligen parallella
25 balkar (8, 9) vilka sträcker sig mellan nämnda ändsektioner (13, 14).
4. Förlängningsanordning för motorfordon enligt något av föregående patentkrav
k ä n n e t e c k n a d a v
att nämnda ramkonstruktion innefattar ett övre bärande parti (11) och ett nedre
30 bärande parti (12) samt sidopartier (15, 16, 17, 18) vilka partier sträcker sig
mellan nämnda ändsektioner (13, 14).
5. Förlängningsanordning för motorfordon enligt patentkrav 4
k ä n n e t e c k n a d a v

att nämnda övre bärande parti (11) är försett med en öppning (24) för medgivande av åtkomst till förlängningsanordningens (10) insida.

- 5 6. Förlängningsanordning för motorfordon enligt något av föregående patentkrav
k ä n n e t e c k n a d a v
att en styrtapp (21) med huvudsakligen cylindriskt tvärsnitt är anordnad på den bakre ändsektionen (14).
- 10 7. Förlängningsanordning för motorfordon enligt patentkrav 6
k ä n n e t e c k n a d a v
att nämnda styrtapp (21) är försedd med ett lager (28), företrädesvis ett kullager, för lagring av en genom förlängningsanordningen (10) sig sträckande kardanaxelparti (27).
- 15 8. Förlängningsanordning för motorfordon enligt patentkrav 7
k ä n n e t e c k n a d a v
att på nämnda kardanaxelparti (27) är anordnat en bromsskiva (32) vilken samverkar, för bromsning, med ett bromsok (31) vilket är fast förbundet med förlängningsanordningen (10).

112110 PA

Sammandrag

- Föreliggande uppfinning avser en förlängningsanordning för motorfordon, såsom
- 5 dumprar, innefattande en ramkonstruktion med en främre ändsektion och en bakre ändsektion där nämnda motorfordon innefattar en främre drivmotoruppbärande fordonsdel med ett första ledorgan samt en bakre fordonsdel med ett andra ledorgan varvid nämnda första och andra ledorgan är avsedda att förbindas med varandra och medge inbördes vridning av fordonsdelarna kring en längdaxel hos motorfordonet.
- 10 Förlängning av motorfordonet utförs genom att ovan nämnda förlängningsanordning infogas mellan dumpers främre och bakre fordonsdel.

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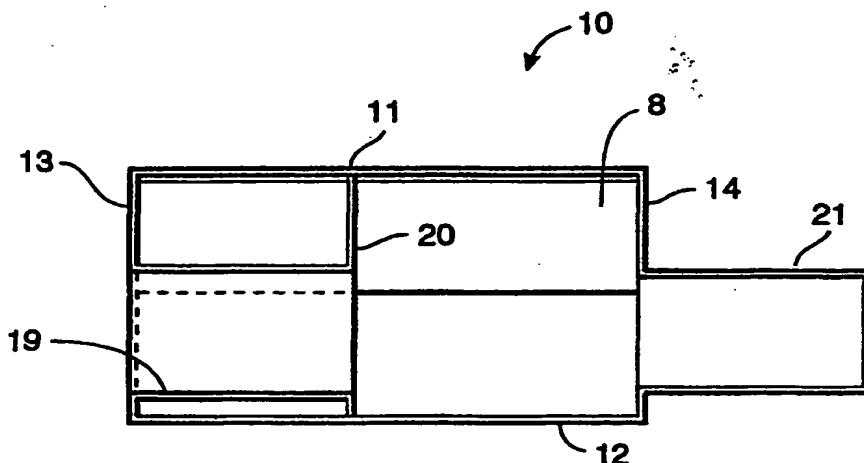
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Published:

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **VEHICLE EXTENSION DEVICE**



(57) Abstract: The present invention relates to an extension device for automotive vehicles, such as dumpers, comprising a framework with a front end section and a rear end section, said automotive vehicles including a forward vehicle section, supporting the primer mover, exhibiting a first articulation member, and a rear vehicle section exhibiting a second articulation member, said first and second articulation members being intended for connection with each other and for allowing pivoting of the vehicle sections in relation to each other, about a longitudinal

axis of the automotive vehicle. The extension of the automotive vehicle is achieved through introducing said extension device between the forward and the rear vehicle portion of the dumper.

WO 01/25075 A1

TITLE

Vehicle extension device

TECHNICAL FIELD

- 5 The present invention relates to an extension device for automotive vehicles, such as dumpers, comprising a framework with a front end section and a rear end section, said automotive vehicles including a forward vehicle section, supporting the prime mover, exhibiting a first articulation member, and a rear vehicle section exhibiting a second articulation member, said first and second articulation members being
10 intended for connection with each other and for allowing pivoting of the vehicle sections, in relation to each other, around a longitudinal axis of the automotive vehicle.

BACKGROUND ART

- When manufacturing commercial automotive vehicles, such as dumpers, it is presently customary to offer, together with a standardised forward vehicle section, a
15 rear, load-carrying vehicle section, the length of which is adapted to the intended area of application and to any built-on accessories, such as a crane. This is resolved by manufacturing the rear vehicle section with a large number of frame lengths.
- 20 The above approach is not cost-effective, however, as production and storage will both be expensive due to the relatively small production series. Further, modifications to the vehicle length cannot be allowed after delivery.

- However, there are cases where the fixed framework of the rear vehicle section is
25 cut off, whereupon extension beams are welded in to obtain, in this way, a vehicle of the required length.

- This, however, is a complicated and time-consuming operation, a/o requiring access to special tools and special equipment. Furthermore, such a solution may require
30 giving the construction a lower strength at the joints, compared to the rest of the construction. Besides this, a subsequent treatment in the form of corrosion protection and painting has to be performed at the joints.

From SE 505 201 a vehicle chassis is previously known, intended for subsequent building-on of equipment, divided into a forward and a rear portion, each having two longitudinal frame members, connected to each other through an intermediate portion. Said intermediate portion comprises an intermediate framework and a number of holed junction members allowing free choice between a number of hole combinations for connecting the intermediate framework, by means of bolt or rivet joints, with the forward and rear portions of the vehicle chassis. An adjustment of the total length of the vehicle chassis can thus be made, in dependence of the selected size of the accessory subsequently to be fitted.

Although the method for extending vehicle frames described above enables an adaptation of the vehicle length, it still has some drawbacks. When modifying the vehicle length a large number of bolts, or rivets, will primarily have to be removed and, after the length adjustment, be refitted, which is very time-consuming. Furthermore, also in this case, there is a risk of the construction having a lower strength in relation to other framework portions.

Common to the above procedures for extension of automotive vehicles after delivery is that relatively large operations have to be performed on the framework of the vehicle, constituting a problem for the vehicle user.

DISCLOSURE OF INVENTION

The object of the invention is to enable an extension of the dumper without having to perform major reconstruction work on the dumper.

The above object is achieved by means of an extension device, the characteristics of which are defined by the independent claim 1.

It is a further object of the invention to provide a device for extension of automotive vehicles, such as dumpers, by which a simple, quick and secure adaptation can be made of the vehicle length, by utilising the parting line provided by the first and second articulation members of the dumper and inserting therebetween an extension device according to the present invention.

It is a further object of the invention to provide a device for extension of vehicles without having to perform extensive fitting work such as bolting/riveting/welding on the vehicle when one and the same vehicle is to be used for different work assignments.

5

The extension device according to the present invention is formed like a framework, comprising two parallel girders enclosed by walls, together defining an elongated, hollow girder having a forward end section and a rear end section, at least the forward one of said end sections being provided with a third articulation member, preferably in the form of a pivot sleeve with a circular cross section, which can be connected to the first articulation member arranged on the forward vehicle section of the dumper that is formed like a pivot pin having a circular cross section.

In a preferred embodiment of the present invention, the extension device is provided with a guide pin, the shape of which substantially coincides with said pivot pin, serving as a guide and reinforcement when fitting the extension device onto the rear, load-carrying vehicle section.

Further advantages and objects of the invention will become apparent from the appended claims and the following description.

BRIEF DESCRIPTION OF DRAWINGS

The invention will be described below in connection with preferred embodiment examples and the enclosed drawings, in which

Fig. 1 shows a side elevational view of a dumper equipped with an extension device according to the present invention,

Fig. 2 shows the front end section of an extension device according to the present invention,

Fig. 3 shows a longitudinal, vertical cross section through an extension device according to the present invention, and

Fig. 4 shows a longitudinal, vertical cross section through an extension device, fitted onto a rear vehicle section, according to the present invention.

25

PREFERRED EMBODIMENT

Fig. 1 illustrates a side elevational view of an articulated or frame-steered vehicle, a so-called dumper 1, having in a known manner a forward vehicle section 2, supporting the prime mover, and a rear, load-carrying vehicle section 3, connected to the forward vehicle section 2 via a vertical pivot axle 4. Between the forward vehicle section 2 and the rear vehicle section 3, an extension device 10 according to the present invention is arranged.

The forward and rear vehicle sections, 2 and 3, respectively, are also pivotally connected to each other about a not shown horizontal pivot pin, allowing the vehicle sections to pivot in relation to each other about a longitudinal axis of the vehicle.

For steering of the vehicle 1 when being driven, the forward vehicle section 2 is brought to turn about the vertical pivot axle 4 by means of a pair of not shown hydraulic cylinders, arranged one on each side of the pivot axle 4. The torque delivered by the prime mover is transferred to the front wheels 5 and to the rear wheels 6, 7, via a not shown cardan shaft.

With reference to Figs. 2 and 3, a preferred embodiment of an extension device 10 according to the present invention will now be described. In the illustrated embodiment, the extension device 10 is formed like a framework comprising two parallel girders enclosed by walls, together defining an elongated, hollow girder. The framework hereby comprises an upper supporting portion 11 and a lower supporting portion 12 extending between a forward end section 13 and a rear end section 14. Adjacent to said upper supporting portion 11, two parallel girders 8, 9 extend between said end sections 13, 14. Side portions 15, 16, 17, 18 also extend between the end sections 13, 14, providing, together with the girders 8, 9 and the upper 11 and the lower 12 supporting portions, the stiffness and strength of the construction. According to a preferred embodiment, the above-mentioned portions 11, 12, 15, 16, 17, 18 and the sections 13, 14 are comprised of steel plates welded together to define said elongated, hollow girder.

In the forward end section 13, a third articulation member in the form of a pivot sleeve 19 with a circular cross section, intended for co-operation with a horizontal

pivot pin with a circular cross section, arranged on the forward vehicle section 2, allowing the extension device 10 to pivot, in relation to said forward vehicle section 2, about a longitudinal axis of the vehicle 1. In a preferred embodiment, the pivot sleeve 19 is on the one hand connected to the end section 13, on the other to a bulkhead 20, arranged in parallel with the end section 13 and constituting a connection member between said upper 11 and lower 12 supporting portions.

Fig. 3 shows an especially preferred embodiment of the present invention in which the rear end section 14 is provided with a guide pin 21 of circular cross section. When fitting the extension device 10 onto the rear vehicle section 3, the guide pin 21 will function as a guide, through being inserted into the articulation member 22 of the rear vehicle section 3. When the extension device 10 is fitted onto the rear vehicle section 3, the guide pin 21 will contribute to reinforcing the junction between the vehicle section 3 and the extension device 10.

Fig. 4 illustrates a more complete embodiment of the present invention with the extension device 10 fitted between the forward vehicle section 2 and the rear vehicle section 3. The guide pin 21 is hereby inserted into the articulation member 22 of the rear vehicle section 3, substantially coinciding in shape with the previously discussed pivot sleeve 19. To prevent rotation about the guide pin 21 of the extension device 10, relative to the rear vehicle section 3, a bolted joint 23 is provided, connecting the rear end section 14 of the extension device 10 with the rear vehicle section 3. Said bolted joint 23 is accessed through an aperture 24 provided in the upper supporting portion 11.

In Fig. 4, the previously mentioned horizontal pivot pin 25 is shown, which is connected, via the pivot axle 4, to the forward vehicle section. The pivot pin 25 is locked in the axial direction in relation to the pivot sleeve 19 of the extension device, by means of a locking member in the form of a nut 29 arranged to co-operate with a threaded portion 30 on the pivot pin 25.

According to a preferred embodiment, the dumper 1 is provided with a drive for the rear pairs of wheels 5, 6, and the torque provided by the prime mover is then transferred via a cardan shaft 26, 27 where the cardan shaft portion 27, located inside the

extension device 10, is an extension member. Said cardan shaft portion 27 is preferably rotatably supported, for example by a ball bearing assembly 28, inside the guide pin 21.

- 5 According to a preferred embodiment of the extension device 10, a brake caliper 31 is fixedly connected to the framework of the extension device 10. Said brake caliper 31 is co-operating with a brake disc 32 arranged on the cardan shaft portion 27. When the brake caliper 31 is activated, in the known manner, the rear wheels 6, 7 are braked.

10

The term dumper, as used in the description and in the claims, shall mean any type of commercial automotive vehicle equipped with a forward vehicle section, supporting the prime mover, and a load- or equipment-carrying rear vehicle section, said vehicle sections being interconnected by means of a pivot joint allowing the vehicle
15 sections to pivot, in relation to each other, about a longitudinal axis of the vehicle.

- The invention will not be limited to what has been stated above, but may be varied within the scope of the appended claims. For example, the guide pin 21 could be excluded and replaced by any other type of fixation, such as a bolted or welded
20 connection. Further, said first and second articulation members do not have to be formed like a pivot pin and a pivot sleeve, respectively, but could be formed like a turntable comprising a vertical ball bearing assembly, the rotational axis of which would be parallel with the longitudinal axis of the vehicle, one bearing race of the assembly being affixed to the forward vehicle section and the other bearing race
25 being affixed to the rear vehicle section. In the above embodiment example, relative rotation is taking place between the vehicle sections at the connection between the forward vehicle section and the extension device, but it should be evident to the person skilled in the art that the rotation could just as well take place between the rear vehicle section and the extension device, or even at both of the above-mentioned
30 locations. Furthermore it is advantageous to provide the extension device with a built-on accessory in the form of for example a crane.

CLAIMS

1. An extension device for automotive vehicles, such as dumpers (1), comprising a framework with a front end section (13) and a rear end section (14),
5 said automotive vehicles including a forward vehicle section (2), supporting the prime mover, exhibiting a first articulation member (25), and a rear vehicle section (3) exhibiting a second articulation member (22), said first (25) and second articulation members (22) being intended for connection with each other and for allowing pivoting of the vehicle sections (2, 3), in relation to each other, about a longitudinal
10 axis of the automotive vehicle, characterised by at least one of said end sections (13, 14) being provided with a third articulation member (19) intended for connection with one of said first (25) or second (22) articulation members.
2. The extension device for automotive vehicles according to claim 1,
15 characterised by said first articulation member (25) comprising a pivot pin having a circular cross section and being intended for connection with said third articulation member (19) consisting of a pivot sleeve with a circular cross section.
3. The extension device for automotive vehicles according to claim 2,
20 characterised by said framework comprising at least two, substantially parallel girders (8, 9), extending between said end sections (13, 14).
4. An extension device for automotive vehicles according to any one of the previous claims, characterised by said framework comprising an
25 upper supporting portion (11), a lower supporting portion (12) and side portions (15, 16, 17, 18), said portions extending between said end sections (13, 14).
5. The extension device for automotive vehicles according to claim 4,
characterised by said upper supporting portion (11) being provided with
30 an aperture (24), allowing access to the inside of the extension device (10).
6. An extension device for automotive vehicles according to any one of the previous claims, characterised by a guide pin (21) with a substantially cylindrical cross-section being arranged on the rear end section (14).

7. The extension device for automotive vehicles according to claim 6,
c h a r a c t e r i s e d b y said guide pin (21) being provided with a bearing (28)
preferably a ball bearing assembly (28) for supporting a cardan shaft portion (27)
5 extending through the extension device (10).

8. The extension device for automotive vehicles according to claim 7,
c h a r a c t e r i s e d b y a brake disc (32) being arranged on said cardan shaft
portion (27), said disc co-operating, for braking, with a brake caliper (31) fixedly
10 connected to the extension device (10).

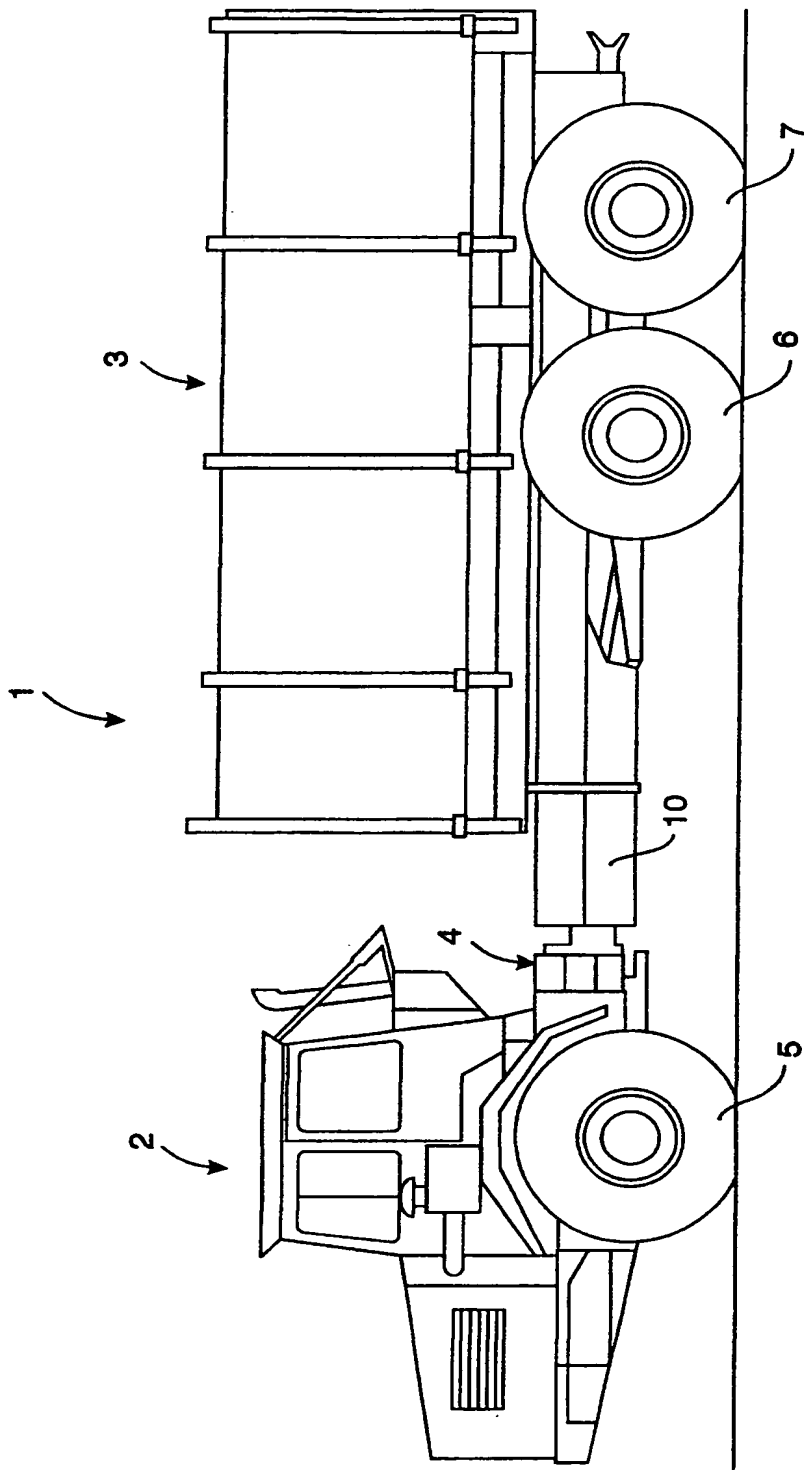


Fig.1

2/3

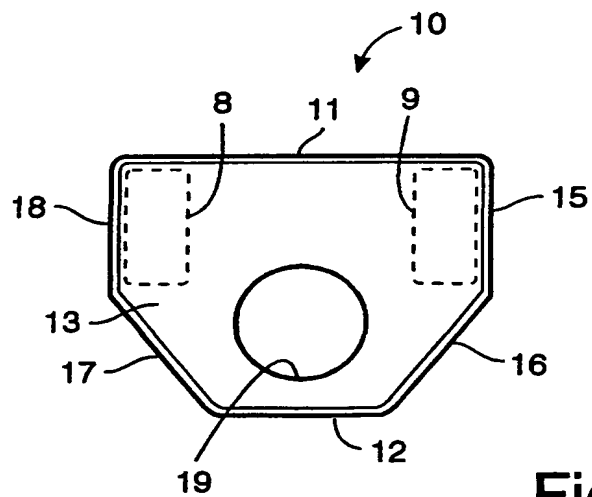


Fig.2

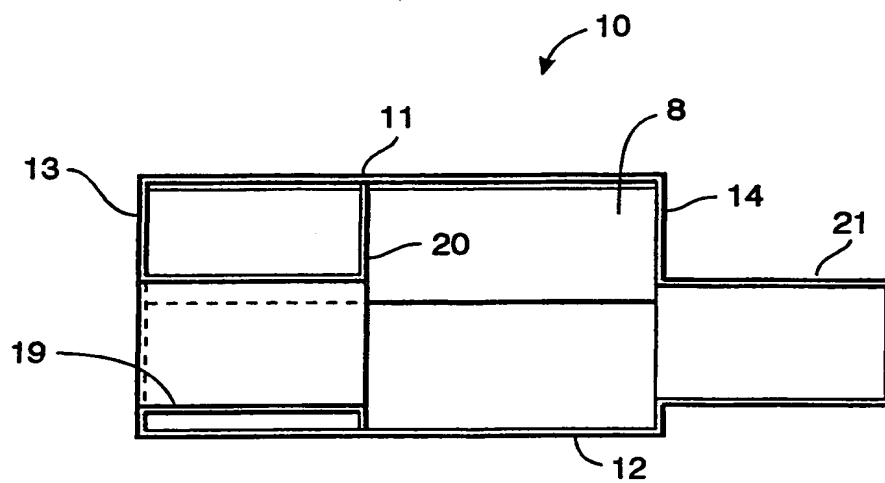


Fig.3

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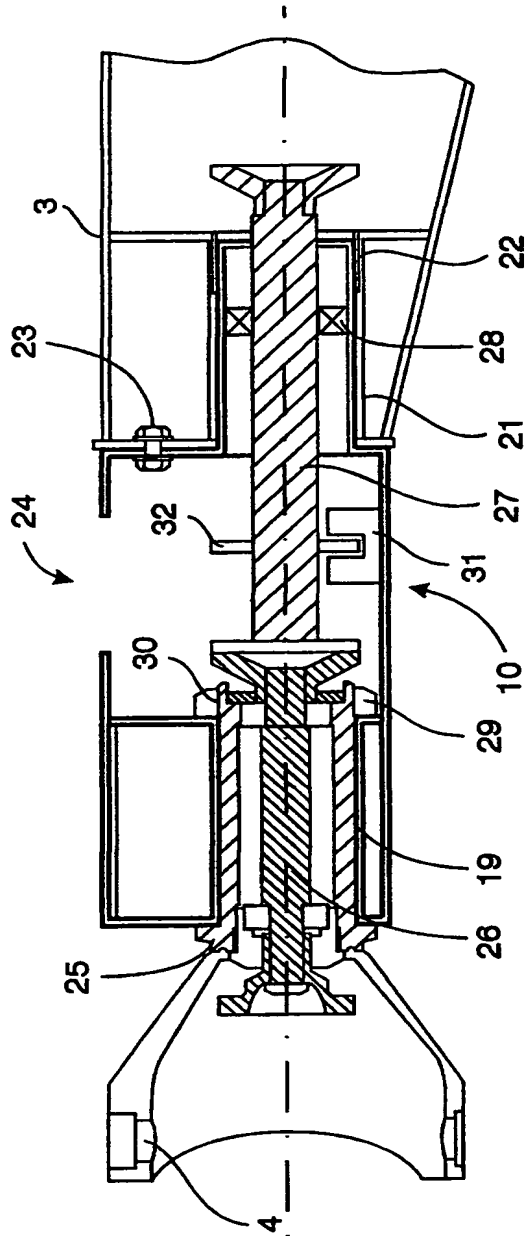


Fig. 4

INTERNATIONAL SEARCH REPORT

1

International application No.
PCT/SE 00/01883

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B62D 53/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B62D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|--|-----------------------|
| A | SU 729100 A (LENINGRAD FORESTRY ACAD), 28 April 1980 (28.04.80) -- | 1-8 |
| A | FR 2554394 A1 (ROULIERE, PAUL), 10 May 1985 (10.05.85), figure 1, abstract ----- | 1-8 |

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "I" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT
Information on patent family members

04/12/00

International application No.
PCT/SE 00/01883

| Patent document cited in search report | | | Publication date | Patent family member(s) | Publication date |
|---|---------|----|---------------------|----------------------------|---------------------|
| SU | 729100 | A | 28/04/80 | NONE | |
| FR | 2554394 | A1 | 10/05/85 | NONE | |